ILNAS

Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 17844:2023

Construction products: Assessment of release of dangerous substances - Determination of the content of polycyclic aromatic hydrocarbons

Bauprodukte: Bewertung der Freisetzung von gefährlichen Stoffen - Bestimmung des Gehalts an polyzyklischen aromatischen Kohlenwasserstoffen (PAK)

Produits de construction : Évaluation de l'émission de substances dangereuses - Détermination de la teneur en hydrocarbures aromatiques

11/2023

National Foreword

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English Version

Construction products: Assessment of release of dangerous substances - Determination of the content of polycyclic aromatic hydrocarbons (PAH) and of benzene, toluene, ethylbenzene and xylenes (BTEX) - Gas chromatographic method with mass spectrometric detection

Produits de construction : Évaluation de l'émission de substances dangereuses - Détermination de la teneur en hydrocarbures aromatiques polycycliques (HAP) et en benzène, toluène, éthylbenzène et xylènes (BTEX) - Chromatographie en phase gazeuse avec détection par spectrométrie de masse

Bauprodukte: Bewertung der Freisetzung von gefährlichen Stoffen - Bestimmung des Gehalts an polyzyklischen aromatischen Kohlenwasserstoffen (PAK) und an Benzol, Toluol, Ethylbenzol und Xylol (BTEX) - Gas-chromatographisches Verfahren mit massenspektrometrischer Detektion

This European Standard was approved by CEN on 14 August 2023.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 17844:2023) has been prepared by Technical Committee CEN/TC 351 “Construction products: Assessment of release of dangerous substances”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2024, and conflicting national standards shall be withdrawn at the latest by May 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document deals with the determination of the content of polycyclic aromatic hydrocarbons (PAH) and of benzene, toluene, ethylbenzene and xylenes (BTEX) with gas chromatography with mass spectrometric detection (GC-MS). NEN 7331 has been used as basis.

This document is intended to be used for construction products and is suitable for determining:

— the full suite PAH, including the EPA-PAH series ([EPA 8100]);

— six BTEX.

In some cases, additional analysis with high performance liquid chromatography (HPLC) can be necessary to determine a number of compounds.

The methods described have been subjected to robustness validation [Van De Weghe et al., 2018]. The detectability limit of the methods for individual compounds in construction products for PAH is 0,5 mg/kg to 1,5 mg/kg and for BTEX 0,1 mg/kg.

This document is part of a modular horizontal approach and belongs to the analytical step. An overview of all modules which belong to a chain of measurement and the manner how modules are selected is given in CEN/TR 16220.

In the growing amount of product and sector-oriented test methods it was recognized that many steps in test procedures are or could be used in test procedures for many products, materials and sectors. It was supposed that, by careful determination of these steps and selection of specific questions within these steps, elements of the test procedure could be described in a way that can be used for all materials and products or for all materials and products with certain specifications.

In this context a horizontal modular approach is adopted in CEN/TC 351. “Horizontal” means that the methods can be used for a wide range of materials and products with certain properties. “Modular” means that a test standard developed in this approach concerns a specific step in assessing a property and not the whole “chain of measurement” (from sampling to analyses). A beneficial feature of this approach is that “modules” can be replaced by better ones without jeopardizing the standard “chain”.

The use of modular horizontal standards implies the drawing of test schemes as well. Before executing a test on a certain material or product to determine certain characteristics, it is necessary to draw up a protocol in which the adequate modules are selected and together form the basis for the entire test procedure.

1 Scope

This document describes two methods for determining the content of polycyclic aromatic hydrocarbons (PAH) and one method for determining the content of benzene, toluene, ethylbenzene and xylenes (BTEX) with gas chromatography with mass spectrometric detection (GC-MS).

See Annex A (normative) for lists of PAH and BTEX that can be determined with this document.

This document is intended to be used for construction products.

In a number of cases additional analysis with high performance liquid chromatography (HPLC) can be necessary to determine a number of compounds. To determine PAH multiple liquid-liquid extraction is used to remove interfering compounds, e.g. maltenes. The tests that led to this document were carried out on different types of roofing material, bitumen and bituminous binders as well as asphalt including one tar containing asphalt (see [Van De Weghe at el., 2018] and [García-Ruiz et al., 2020]).

The detectability limit of the methods for individual compounds in roofing material, asphalt and tar containing asphalt for PAH is 0,5 mg/kg to 1,5 mg/kg and for BTEX 0,1 mg/kg.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 58, *Bitumen and bituminous binders — Sampling bituminous binders*

EN 12594, *Bitumen and bituminous binders — Preparation of test samples*

EN 16687:2023, *Construction products: Assessment of release of dangerous substances — Terminology*

EN 17087, *Construction products: Assessment of release of dangerous substances — Preparation of test portions from the laboratory sample for testing of release and analysis of content*

EN ISO 15009, *Soil quality — Gas chromatographic determination of the content of volatile aromatic hydrocarbons, naphthalene and volatile halogenated hydrocarbons — Purge-and-trap method with thermal desorption (ISO 15009)*

ISO 20595, *Water quality — Determination of selected highly volatile organic compounds in water — Method using gas chromatography and mass spectrometry by static headspace technique (HS-GC-MS)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16687:2023 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/